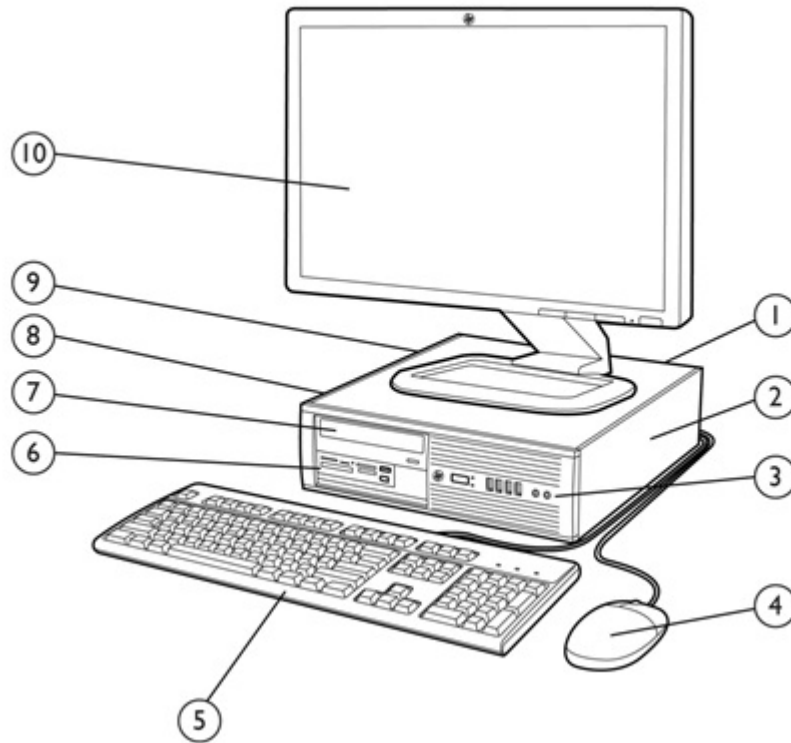


### Overview

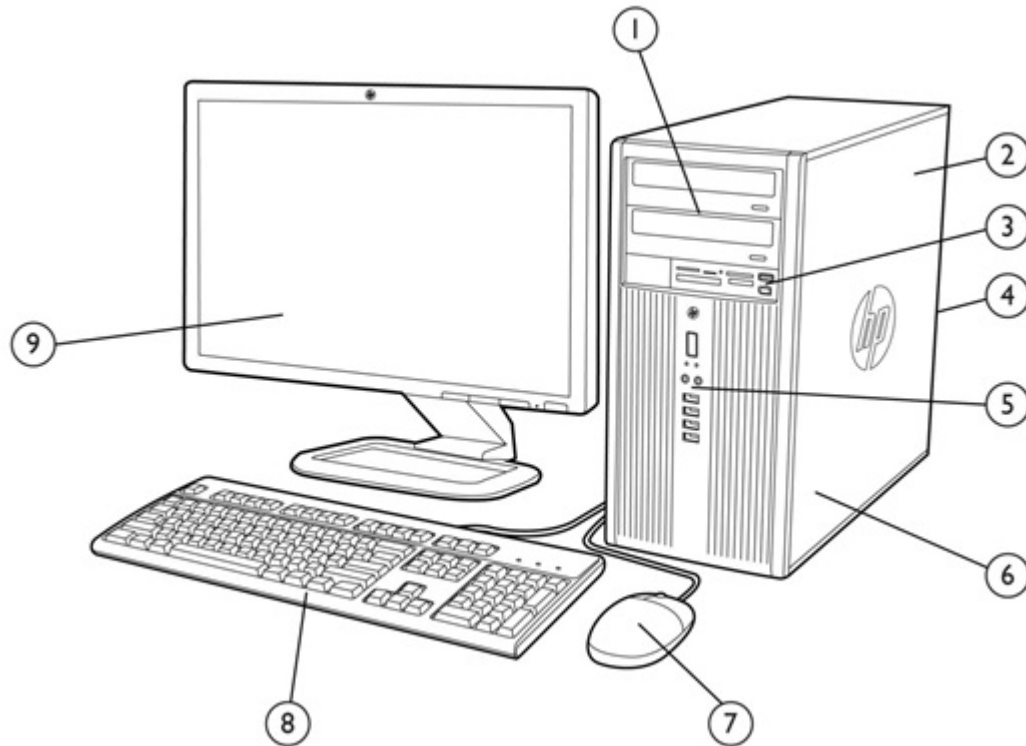
#### HP COMPAQ PRO 6305 SMALL FORM FACTOR BUSINESS PC



- 1 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort and VGA video interfaces, and 3.5mm audio in/out jacks
- 2 (4) Low-profile expansion slots include (1) PCI, (1) PCI Express x1, (1) PCI Express x4, and (1) PCI Express x16 graphics
- 3 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 4 HP Mouse
- 5 HP Keyboard
- 6 3.5" external drive bay supporting an optional media card reader or a secondary data drive
- 7 5.25" external drive bay supporting an optical disk drive
- 8 3.5" internal drive bay supporting primary data drive
- 9 240W standard efficiency or 90% high efficiency power supply
- 10 HP Monitor (sold separately)

### Overview

### HP COMPAQ PRO 6305 MICROTOWER BUSINESS PC



- 1 (2) 5.25" external drive bays supporting optical disk drives or removable hard disk drives  
(2) 3.5" internal drive bays supporting data drives
- 2 320W standard efficiency or 90% high efficiency power supply
- 3 3.5" external drive bay supporting the optional HP Media Card Reader
- 4 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort and VGA video interfaces, and 3.5mm audio in/out jacks
- 5 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
- 6 (4) Full-height expansion slots include: (1) PCI, (1) PCI Express x1, and (2) PCI Express x16 graphics (secondary slot physically x16 wired as x4)
- 7 HP Mouse
- 8 HP Keyboard
- 9 HP Monitor (sold separately)

### Overview

#### At A Glance

- Choice of two professional chassis form factors: Small Form Factor and Microtower.
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- AMD 75 chipset with integrated AMD Radeon HD 7000 Series Discrete Graphics supporting AMD A-Series Quad-Core and Dual-Core Processors
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Dual independent monitor support via VGA and digital DisplayPort video interfaces
- Standard efficiency or 90% high efficiency energy saving power supplies available
- ENERGY STAR® qualified models certified EPEAT® Gold
- Guaranteed lengthy purchase lifecycles and image stability
- Software image fully compatible across all models and form factors
- Created using industry leading Design for Environment standards
- Selected configurations with global availability easily set up and ordered through HP.com Business to Business portals (<http://h10019.www1.hp.com/business-site/index.html>)
- Tailored HP Factory Express deployment and lifecycle services available (<http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx>)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply)
- Tool-less serviceability features for easier upgrades and repairs

Standard Features and Configurable Components (availability may vary by country)

### OPERATING SYSTEMS

#### Preinstalled

Windows 8.1 Pro (64-bit)\*

Windows 8.1 (64-bit)\*

Windows® 7 Ultimate (64-bit)\*\*

Windows® 7 Professional (32-bit)\*\*

Windows® 7 Professional (64-bit)\*\*

Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*

Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*

Windows® 7 Home Premium (64-bit)\*\*

Windows® 7 Home Basic (32-bit)\*\*

FreeDOS 2.0

Novell SUSE Linux Enterprise Desktop 11

\*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

\*\*Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

\*\*\*This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

### CHIPSET

AMD A75 chipset (FCH 6 SATA 6Gb/s, 4 USB 3.0)

### PROCESSOR

#### AMD A-Series Quad-Core Processors

AMD A10-6800B with Radeon™ HD 8670D Graphics (4.1 GHz, 4MB L2 cache, 100W)

AMD A10-5800B with Radeon™ HD 7660D Graphics (3.8 GHz, 4MB L2 cache, 100W)

AMD A8-6500B with Radeon™ HD 8570 (3.5 GHz, 4MB L2 cache, 65W)

AMD A8-5500B with Radeon™ HD 7560D Graphics (3.2 GHz, 4MB L2 cache, 65W)

#### AMD A-Series Dual-Core Processors

AMD A6-6400B with Radeon™ HD 8470 (3.9 GHz, 1MB L2 cache, 65W)

AMD A6-5400B with Radeon™ HD 7540D Graphics (3.6 GHz, 1MB L2 cache, 65W)

AMD A4-6300B with Radeon™ HD 8370 (3.7 GHz, 1MB L2 cache, 65W)

AMD A4-5300B with Radeon™ HD 7480D Graphics (3.4 GHz, 1MB L2 cache, 65W)

Standard Features and Configurable Components (availability may vary by country)

### GRAPHICS

#### **Integrated on all models (depends on processor)**

AMD Radeon™ HD Graphics: 7480D, 7540D, 7560D, 7660D

#### **Discrete**

AMD Radeon™ HD 6350 (512 MB) PCIe x16  
(includes a DMS-59 to Dual VGA Y Cable)

AMD Radeon™ HD 7450 (1 GB) PCIe x16  
(includes a DVI to VGA adapter cable)

NVIDIA NVS 300 (512 MB) PCIe x16  
(Includes a DMS-59 to Dual VGA Y Cable)

NVIDIA NVS 310 (512 MB) PCIe x16  
NVIDIA GeForce GT 630 PCIe x 16

#### **Adapters and Cables**

DisplayPort to DisplayPort Cable

DisplayPort to DVI-D Adapter

DisplayPort to HDMI Adapter

DisplayPort to VGA Adapter

HP DVI Cable Kit

HP DVI to VGA Adapter

### STORAGE

#### **SATA Hard Drive**

250 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

#### **SATA Self-encrypting Drive**

500 GB, SATA, 3.5"

#### **SATA Self-encrypting Solid State Drive**

256 GB, SATA, 3.5"

#### **SATA Solid State Drive**

120 GB, SATA (with 3.5" adapter)

128 GB, SATA (with 3.5" adapter)

#### **Hybrid Drives**

1 TB, SATA 8.0Gb/s, 2.5" SSHD (with 3.5" adapter)

### Standard Features and Configurable Components (availability may vary by country)

500 GB, SATA 8.0Gb/s, 2.5" SSHD (with 3.5" adapter)

#### Optical Disc Drive

DVD-ROM

SuperMulti DVD Writer

Blu-ray BDXL SATA Drive

## MEMORY

#### Type

DDR3 non-ECC; up to 1600 MT/s

#### Maximum

32 GB

#### # of Slots

4

**NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

## NETWORKING/COMMUNICATIONS

#### Ethernet (RJ-45)

Broadcom NetXtreme Gigabit Ethernet BCM 5761 (integrated)

Broadcom NetXtreme Gigabit Ethernet Plus PCIe NIC (optional)

Intel Ethernet i210-ti Gigabit NIC (optional)

#### Wireless

802.11 g/n 1x2 PCIe NIC (optional)

## AUDIO/MULTIMEDIA

High Definition Audio with Realtek ALC221 codec (all ports are stereo)

Microphone\* and headphone front ports (3.5mm)

Line-out and Line-In rear Ports\* (3.5mm)

Multi-streaming capable\*

Internal Speaker (standard)

Thin USB power speakers (optional)

\* The front microphone port is re-taskable as a Line-in, Microphone-in or Headphone-out port. Rear audio input ports are re-taskable as a Line-in or Microphone-in port. External speakers must be powered externally. Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.

Standard Features and Configurable Components (availability may vary by country)

### KEYBOARDS AND POINTING DEVICES

#### Keyboard

PS/2 Keyboard

USB Keyboard

USB Smart Card (CCID) Keyboard

USB and PS/2 Washable Keyboard

Wireless Keyboard and Mouse Combo

(Keyboard contains 25% post-consumer recycled plastic material)

Wireless Keyboard and Dongle (Brazil)

#### Mice

PS/2 Optical Mouse

USB Optical Mouse

USB Laser Mouse

USB and PS/2 Washable Mouse

Wireless Laser Mouse Brazil

### HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Compaq Pro 6305 Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Supports UEFI specification 2.1
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

#### Additional HP BIOS Features

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Compaq business PCs use ACPI to provide power conservation features.

### Standard Features and Configurable Components (availability may vary by country)

- S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W in S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

### SECURITY

Trusted Platform Module (TPM) 1.2  
 SATA port disablement (via BIOS)  
 Drive lock  
 Serial, parallel, USB enable/disable (via BIOS)  
 Optional USB Port Disable at factory (user configurable via BIOS)  
 Removable media write/boot control  
 Power-On password (via BIOS)  
 Setup password (via BIOS)  
 HP Solenoid Hood Lock / Sensor  
 Support for chassis padlocks and cable lock devices

### POWER

	SFF	MT
<b>Power Supply</b>		
240 W, active PFC, 90% high efficiency	X	
240 W active PFC, standard efficiency	X	
320 W, active PFC, 90% high efficiency		X
320 W active PFC, standard efficiency		X

### ENVIRONMENTAL & REGULATORY

Energy Star® qualified models available  
 EPEAT® registered where applicable/supported. See [www.epeat.net](http://www.epeat.net) for registration status by country.  
 Low Halogen  
 TAA compliant



Standard Features and Configurable Components (availability may vary by country)

### PORTS

#### I/O Ports – Standard

- 4 – USB 3.0 (rear)
- 4 – USB 2.0 (front)
- 2 – USB 2.0 (rear)
- 1 – Serial RS-232 compatible
- 2 – PS/2 (color-coded support for keyboard (purple) and mouse (green))
- 1 – VGA
- 1 – DisplayPort
- 1 – Microphone and Headphone (front)
- 1 – Audio-in and Audio-out (rear)
- 1 – RJ-45 (accesses the integrated network interface controller)

#### I/O Ports – Optional

- 1 – Serial RS-232 compatible
- 1 – Parallel
- 1 – eSATA

### BAYS

	<b>SFF</b>	<b>MT</b>
3.5" external <i>(For Media Card Reader unless used for secondary data drive)</i>	1 each	1 each
5.25" external	1 each 8.19" depth	2 each 8.19" depth
3.5" internal HDD	1 each	2 each

### SLOTS

	<b>SFF</b>	<b>MT</b>
PCI (5 volt)	1 each 2.5" low profile 6.6" length 25W max. power	1 each 4.2" full height 6.6" length 25W max. power
PCI Express x1 (2.0)	1 each 2.5" low profile 6.6" length 10W max. power	1 each 4.2" full height 6.6" length 10W max. power
PCI Express x16 (3.0 – Primary) (secondary slot physically x16 wired as x4)	2 each 2.5" low profile 6.6" length 25W max. power	2 each 4.2" full height 6.6" length 75W max. power

Standard Features and Configurable Components (availability may vary by country)

### FORM FACTORS AVAILABLE

Small Form Factor

Microtower

### SERVICE AND SUPPORT

On-site Warranty<sup>Note 1</sup>: Three-year (3-3-3) limited warranty delivers three years of on-site, next business-day<sup>Note 2</sup> service for parts and labor and includes free telephone support<sup>Note 3</sup>: 24 x 7. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Carepack. To choose the right level of service for your HP product, visit HP Care Pack Central: [www.hp.com/go/cpc](http://www.hp.com/go/cpc)

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

**NOTE 3:** Technical telephone support applies only to HP-configured, HP and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

### Technical Specifications – Operating Systems, Software and eDocumentation

#### OPERATING SYSTEMS

##### Preinstalled

Windows 8.1 Pro (64-bit)\*  
Windows 8.1 (64-bit)\*  
Windows® 7 Ultimate (64-bit)\*\*  
Windows® 7 Professional (32-bit)\*\*  
Windows® 7 Professional (64-bit)\*\*  
Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*  
Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)\*\*\*  
Windows® 7 Home Premium (64-bit)\*\*  
Windows® 7 Home Basic (32-bit)\*\*

For all Preinstalled operating systems HP provides Microsoft WHQL certified (where applicable) drivers on [www.hp.com](http://www.hp.com) at the time of product announcement.

##### Supported

Windows® 7 Enterprise (32-bit or 64-bit)\*\*  
Windows 8 Enterprise (32bit or 64-bit)\*  
Windows 8 Pro (32-bit)\*  
Windows 8 (32-bit)\*  
Microsoft Windows® Vista Home Basic SP2 (32 bit)  
Microsoft Windows® Vista Business SP2 (32 & 64bit)  
Microsoft Windows® Vista Enterprise SP2 (32 & 64 bit)

For all Supported operating systems HP performs testing of the OS, and makes available all HP value add software (OS dependent). Certified drivers are made available on [www.hp.com](http://www.hp.com) within 30 days of product announcement.

##### Limited Support

Windows® XP Professional (32-bit)

For all Limited Support operating systems HP will make available on [www.hp.com](http://www.hp.com) certified drivers for major subsystems, if not provided by the operating system, within 30 days of product announcement.

HP performs functional testing on representative1 configurations. Some newer technologies may not be supported.

HP value added software and 3rd party applications (i.e. DVD players) are not supported.

##### Certified

Novell SUSE Linux Enterprise Desktop 11

For all Certified operating systems HP will submit hardware to the operating system vendor for testing and certification. All drivers would be obtained from the operating system vendor, not supplied by HP. Certification will be posted by the operating system vendor.

\*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

\*\*Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

\*\*\*This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

The following features are not supported by Novell SUSE Linux Enterprise Desktop:

- Broadcom NetXtreme Gigabit Ethernet Plus
- HP Client Security

### Technical Specifications – Operating Systems, Software and eDocumentation

- HP Blu-ray BDXL SATA Drive playback of commercial movies
- DisplayPort video interface
- HP 2nd serial port adapter
- Power Management features
- Systems configured with Linux do not qualify for ENERGY STAR®

### SOFTWARE

Included	Windows 8.1	Windows 7
<b>Security</b>	HP Client Security <ul style="list-style-type: none"> <li>• Credential Manager</li> <li>• Password Manager</li> <li>• One Step Logon</li> <li>• SpareKey</li> <li>• Device Access Manager w/JITA</li> <li>• HP Trust Circles</li> <li>• File Sanitizer</li> </ul> Computrace (user optional)** Windows Defender	HP Client Security <ul style="list-style-type: none"> <li>• Credential Manager</li> <li>• Password Manager</li> <li>• One Step Logon</li> <li>• Face Recognition (with optional WebCam)</li> <li>• SpareKey</li> <li>• DigitalPass</li> <li>• Device Access Manager w/ JITA</li> <li>• Drive Encryption (McAfee)</li> <li>• File Sanitizer</li> <li>• Privacy Manager</li> </ul> Computrace (user optional)** Microsoft Security Essentials
<b>Windows Applications</b>	Internet Explorer Store Desktop Photos Mail Games Calendar People (contacts) Messaging SkyDrive Music Video Camera News Sports Weather Maps Finance Bing (Search)	Bing (Search) Internet Explorer
<b>Productivity</b>	Buy Office	Buy Office
<b>HP Additions</b>	HP Registration HP Getting Started with Windows 8 HP ePrint*** HP Support Assistant	Corel WinDVD 10.0 SD (DVD) Player**** Corel WinDVD 10.0 BD (Blu-Ray) Player**** Roxio MyDVD Business 2010**** Roxio MyDVD Business 2010 HD****

### Technical Specifications – Operating Systems, Software and eDocumentation

	CyberLink PowerDVD SD, BD CyberLink Power2Go HP Mobile Connect Skype HP PageLift SRS Premium Sound	HP Marketplace Cyberlink PowerDVD Cyberlink Power2Go HP ePrint*** HP Wallpaper SRS Premium Sound AMD Eyefinity Technology HP Recovery Disc Creator
<b>Desktop Applications</b>	HP Wireless Hotspot HP Support Assistant PDF Complete, Corporate edition	PDF Complete Corporate Edition WinZip Basic Adobe Flash Player
<b>HP Documentation (eDOCS)</b>	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation
<b>HP Support Applications</b>	HP EUDI Support Environment HP Help and Support HP Setup v9.0 HP Support Assistant	HP EUDI Support Environment HP Help and Support HP Recovery Manager HP Setup v9.0 HP Support Assistant

\*Available via download

\*\* Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging from one to five years. Service is limited, check with Absolute for availability outside the U.S.

\*\*\* Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see [www.hp.com/go/eprintcenter](http://www.hp.com/go/eprintcenter)). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.

\*\*\*\*Preinstalled on models with webcam

\*\*\*\*\*Optional

### Technical Specifications - Graphics

#### ATI HD 7000D Graphics (integrated)

<b>Memory</b>	Variable and user selectable in BIOS settings
<b>Controller Clock Speed</b>	Variable depending on the installed APU model
<b>Maximum Color Depth</b>	32 bpp
<b>Multi-display Support</b>	Yes
<b>Graphics/Video API Support</b>	DX11.1, OpenGL 2.0
<b>Output connectors</b>	1 VGA and 1 Multi-Mode (DP++) 1.2 compliant Display Port output with HBR2, audio and multistreaming support
<b>VGA DAC Frequency</b>	400 MHz

Resolutions Supported*	Resolution	Maximum Refresh Rate (Hz)	
		VGA Connection	DisplayPort Connection
	640x480	85	60
	800x600	85	60
	1024x768	85	60
	1280x720	85	60
	1280x1024	85	60
	1440x900	75	60
	1600x1200	85	60
	1680x1050	75	60
	1920x1080	85	60
	1920x1200	85	60
	1920x1440	85	60
	2048x1536	75	60
	2560x1440	N/A	60
	2560x1600	N/A	60

\*Other resolutions may also work, but have not been validated.

#### AMD Radeon HD 6350 Graphics Card

##### Introduction

The AMD Radeon HD 6350 DH PCIe x16 Graphics Card provides a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 6350 GPU. This card supports dual display video output through its DMS-59 connector.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 6350 DH PCIe x16 Graphics Card is an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

##### Key Benefits

- 512 MB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory

### Technical Specifications - Graphics

- AMD Radeon™ HD 6350 GPU
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Provides Dual VGA (via DMS-59 connector: DVI kit optional: part number DL139A) output port
- HDCP supported on DVI outputs ( DVI Requires optional kit DL139A)
- DirectX 11.1 support in hardware for optimal performance in DX11.1 applications.
- AMD Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications

**NOTE:** The AMD Radeon HD 6350 PCIe x16 Graphics Card does not support Dual-link DVI capable monitors.

<b>Factory Default Output Connector</b>	DMS-59 to dual VGA Y Cable
<b>Form Factor</b>	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to MT
<b>Graphics Controller</b>	AMD HD 6350 GPU
<b>Output Connector</b>	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Also supports dual digital displays with an optional DMS-59 to dual DVI cable.
<b>Core Clock</b>	650MHz
<b>Memory Clock</b>	800MHz
<b>Memory Frame Buffer</b>	512MB, DDR3, 64-bit wide
<b>Bus Type</b>	PCI Express x16, Generation 2.0
<b>Max. Vertical Refresh</b>	85Hz
<b>Display Support</b>	Integrated 400MHz RAMDAC
<b>Display Max. Resolution</b>	Digital 1900 x 1200 Analog 2048 x 1536
<b>Max. Power Consumption</b>	19.9W
<b>Supported Graphics APIs</b>	HDCP supported on DVI output using optional DMS-59 to dual DVI cable. DirectX 11.1 support in hardware. OpenGL 4.0 support in hardware.

#### Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R

### Technical Specifications - Graphics

1920 x 1440	85	N/A
2048 x 1536	75	N/A
2560 x 1600	N/A	N/A

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

### AMD Radeon HD 7450 Graphics Card

#### Introduction

The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards provide a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 7450 Graphics Processor\*. These cards support dual displays with its DisplayPort and dual link DVI connectors.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards are an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards delivers PCI Express (PCIe) features including:

- Has flexibility for new applications and enhanced performance
- Full 16 lane PCIe bus support with peak bandwidth support
- High resolution monitor support with the dual-link DVI port
- Multimode DisplayPort connector for current and future display technology support

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

\* Based on AMD Radeon™ HD 6000 series GPU technology

#### Key Benefits

- 1GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Featuring the AMD Radeon™ HD 7450 Graphics Processing Unit
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Provides dual-link (DL) DVI-I and DisplayPort output ports. A DVI-to-VGA adapter cable included
- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits [NR078AA](#), [FH973AT](#), [BP937AA](#), [AS615AA](#).

For a DisplayPort to DisplayPort connection use the optional DisplayPort Cable Kit VN567AA

- Supports audio with video through the DisplayPort connector
- DisplayPort support provided in a future driver update
- HDCP supported on DisplayPort and DVI output
- DirectX 11.1 support in hardware for optimal performance in DX11.1 applications.
- ATI Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications
- Thermally controlled fan for quiet operation.
- Low Halogen construction

#### Factory Default Output Connector

DisplayPort, Dual-link DVI-I with DVI to VGA Adaptor

#### Form Factor

PCI Express x16 (generation 2.0)  
Low Profile, half length, 2.3" x 6.6"  
Full height bracket utilized when configured to MT



### Technical Specifications - Graphics

<b>Graphics Controller</b>	AMD HD 7450 GPU (based on AMD Radeon HD 6000 series technology)
<b>Output Connector</b>	Dual-link (DL) DVI-I and DisplayPort output ports
<b>Core Clock</b>	625MHz
<b>Memory Clock</b>	800MHz
<b>Memory Frame Buffer</b>	1GB, DDR3, 64-bit wide
<b>Bus Type</b>	PCI Express x16, Generation 2.0
<b>Max. Vertical Refresh</b>	85Hz
<b>Display Support</b>	Integrated 400MHz RAMDAC
<b>Display Max. Resolution</b>	Digital 2560 x 1600 Analog 2048 x 1536
<b>Max. Power Consumption</b>	19.9W
<b>Supported Graphics APIs</b>	DirectX 11.1 support in hardware. OpenGL 4.0 support in hardware.

#### Display Resolutions and Refresh Rates

**NOTE:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	60*
2048 x 1536	75	60*
2560 x 1600	N/A	60**

\* Only supported with a Display Port monitor connection

\*\* Only supported when using a dual link DVI or DP monitor connection.

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

### NVIDIA NVS 300 Graphics Card

#### Introduction

The NVIDIA NVS 300 PCIe Graphics Card is a low profile, dual-head graphics card delivering next-generation multi-display capabilities to professional business and commercial applications.

If you require a graphics card for use with desktops in a telesales-center environment, or frequently analyze spreadsheets requiring the flexibility of dual-monitor displays, the NVIDIA NVS 300 PCIe Graphics Card is the ideal solution for you. Easily installed with a

### Technical Specifications - Graphics

setup wizard, this controller integrates seamlessly with the Microsoft Windows environment. nView - NVIDIA's multi-display software, enhances your productivity in single or multi-display environments by allowing you to take advantage of features like gridlines & Virtual Desktops (Virtual Desktops allows an end user to create up to 32 individual desktops)

The NVIDIA NVS 300 PCIe Graphics Card is also GPU computing ready. It is capable of enhancing system performance if used in conjunction with applications that support GPU computing through DirectCompute, CUDA, or OpenCL frameworks.

The NVIDIA NVS 300 PCIe Graphics Card includes 512MB of DDR3 graphics memory. A minimum system memory configuration of 1GB is needed to support this card.

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

#### Key Benefits

- View your work on two monitors with nView multi-display software and create up to 32 individual desktops (using 'Virtual Desktops' with nView)
- Compatible with all major financial, non-linear editing (NLE), and electronic design automation (EDA) applications
- Includes 512 MB of dedicated DDR3 graphics memory
- Deliver crystal-clear images via dual 400-MHz RAMDACs
- Supports the latest flat-panel displays, dual analog or digital displays
- Robust IT management tools for seamless installation, deployment and maintenance
- Passive heatsink for silent operation
- DirectX 10.1 support in hardware for optimal performance in DX10 applications
- OpenGL 3.3 support in hardware for optimal performance with OpenGL applications

<b>Factory Default Output Connections</b>	DMS-59 to dual VGA Y Cable
<b>Form Factor</b>	PCI Express x16 (generation 2.0) Low Profile, half length, 2.586" x 5.7" (6.57 x 14.48 cm) Full height bracket utilized when configured to MT
<b>Graphics Controller</b>	Nvidia GT218 GPU
<b>Memory Frame Buffer</b>	512MB DDR3, 64-bit wide
<b>Output Connectors</b>	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Support dual digital displays with an optional adapter (see complete listing of available optional adapters elsewhere in this QuickSpec).
<b>RAMDAC</b>	Dual 400MHz
<b>Core Clock</b>	520MHz
<b>Memory Clock</b>	790MHz
<b>Frame Buffer</b>	512MB DDR2, 64-bit wide
<b>Maximum Pixel Clock (analog)</b>	400MHz
<b>Overlay planes</b>	One 16-bit video overlay plane
<b>Video Acceleration</b>	Directx 10.1; OpenGL 3.3; CUDA, DirectCompute Full screen, full frame video playback of HDTV, Blu-ray and DVD content
<b>High-definition Video</b>	Inbuilt video decoder for multiple video formats including MPEG2, VC-1, WMV9, H.264, and MVC Capable of decoding dual Video Streams at HD (1080p) resolutions

### Technical Specifications - Graphics

<b>Processor (HDVP)</b>	Hardware color-space conversion (YUV 4:2:2 and 4:2:0) High-Quality in-built Filtering/Scaling Stereo & HD Audio (LPCM 7.1) support for HDMI outputs (HDMI via optional DVI-HDMI dongles) with the DMS-59 to DisplayPort Adapter
<b>Supported Graphics APIs</b>	OpenGL 3.3 support in hardware DirectX 10.0 support in hardware

#### Display Resolutions and Refresh Rates

**Note:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

### NVIDIA NVS 310 Graphics Card

#### Introduction

The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.

The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.

#### Performance and Features

The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.

- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits [NR078AA](#), [FH973AT](#), [BP937AA](#), [AS615AA](#).
- For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.

*\*With the appropriate adapter cable*

<b>Form Factor (H x L)</b>	Low Profile: 2.713 x 6.15 in
<b>Bus Type</b>	PCI Express x16, 2.0 compliant
<b>Graphics Controller</b>	NVIDIA® NVS 310
<b>Memory Size</b>	512 MB DDR3

### Technical Specifications - Graphics

<b>Memory Clock</b>	875MHz
<b>Memory Bandwidth</b>	14 GB/s
<b>Connectors</b>	2 x DisplayPort 1.2
<b>Maximum Resolution</b>	Up to 2560 x 1600 (digital display) per display.
<b>Display Output</b>	Up to 2 displays in the following configurations DisplayPort output: <ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology.</li> </ul> DVI-D output: <ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 x 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul> HDMI output: <ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 x 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul> VGA display output: <ul style="list-style-type: none"> <li>• Drives two analog display at resolutions up to 1920 x 1200 at 60 Hz using DisplayPort to VGA cable adaptors</li> </ul>
<b>Max. Power</b>	19.5 W

### Display Resolutions and Refresh Rates

**Note:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rates (Hz) by Connection			
	DisplayPort to VGA	DisplayPort to DVI-D	DisplayPort to HDMI	DisplayPort
640 x 480	85	60	60	60
800 x 600	85	60	60	60
1024 x 768	85	60	60	60
1280 x 720	85	60	60	60
1280 x 1024	85	60	60	60
1440 x 900	75	60	60	60
1600 x 1200	60	60	60	60
1680 x 1050	60	60	60	60
1920 x 1080	60-R	60-R	60	60
1920 x 1200	60-R	60-R		60
1920 x 1440				60
2048 x 1536				60
2560 x 1600				60

### Technical Specifications - Graphics

**Note:** 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

#### NVIDIA GeForce GT 630 Graphics Card

##### Introduction

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card Graphics Card provides a full height, PCI Express x16 graphics add-in card solution based on the NVIDIA Kepler Architecture GPU. The card is designed to support three display connections through its DVI, and two DisplayPort connectors.

An ideal solution for desktop PC customers seeking enhanced 2D and advanced 3D graphics performance, the NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards are an excellent choice for business users who want run multiple displays from a single graphics board. Engage in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards deliver superior PCI Express (PCIe) Gen 3 features including:

- Unprecedented flexibility for new applications and enhanced performance
- Support for NVIDIA surround technology
- Run multiple displays from a single graphics card
- Full 16 lane PCIe Generation 3 bus support with peak bandwidth support
- Wireless Display ready for future support

**NOTE:** Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

##### Key Benefits

- 2 GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Features the latest NVIDIA Kepler Architecture GPU Support
- Run multiple displays from a single graphics board
- DisplayPort 1.2 hardware ready for future multi-monitor support
- Provides Dual-Link (DL) DVI-I and two multimode DisplayPort output ports (useable at the same time)
- Also supports legacy displays using adapters:
  - DVI-I to VGA adapter (1 included)
  - HP DP to DVI-D adapter FH973AA (1 included)
  - HP DP to HDMI adapter BP937AA (optional)
  - HP DP to VGA adapter AS615AA (optional)
  - HP DP to dual link DVI-D adapter NR078AA (optional)
- Supports Audio over DisplayPort for users who need audio with video thru the DisplayPort connector. Audio is also supported with the optional HP DP to HDMI adapter (BP937AA).
- Audio is also supported using DVI to HDMI adapters (Adapters not available from HP)
- Conforms to full PCI Express 3.0A specification for full height form factor (x16 lanes native PCI Express implementation)
- HDCP supported on DVI and DisplayPort outputs
- DirectX11.1 support in hardware for optimal performance in DX11.1 applications
- OpenGL 4.2 support in hardware for optimal performance with OpenGL applications

#### NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card

Memory	Peak theoretical memory bandwidth
2 GB DDR3 128 bit	28.5 GB/s

##### Compatibility



### Technical Specifications - Graphics

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card is compatible with the HP Compaq 6005 Pro MT, HP Compaq 6200 Pro MT, HP Compaq 8200 Elite MT/CMT, HP Compaq Elite 8300 MT/CMT, HP Pro 6300 MT, HP Pro 3330 MT, HP Pro 3335 MT, HP Pro 3340 MT.

**NOTE:** Not all models are available in all regions.

#### Service and Support

Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.

**Output connectors** 1 - Dual link DVI; 2 - Multimode Display Port outputs

**Board display options** Supports three displays

	Specification	Description
<b>Board configuration</b>	Graphics Chip	NVIDIA Kepler Architecture GPU
	Core clock	875 MHz
	Memory clock	891 MHz
	Frame buffer	2GB DDR3, 128 bit wide

**Bus type** PCI Express (x16 lanes) 3.0

**Maximum vertical refresh rate** 85 Hz

**Display support** Integrated 400 MHz RAMDAC

**Display max resolution** 2560 x 1600 digital, 2048 x 1536 analog

#### Display Resolutions and Refresh Rates

**Note:** Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	60
2048x1536	75	60
2560x1600	N/A	60

**NOTE:** 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

### Technical Specifications – Hard Disk and Solid State Storage

#### Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP Compaq Pro 6305 Business PC supports the latest SATA 6.0Gb/s specification.

#### HP Drive Lock

HP Serial ATA Hard Drives offer enhanced security via a new Drive Lock. When enabled, this ATA security feature set prevents software access to user data on the drive until one or two user-defined passwords are provided.

#### SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

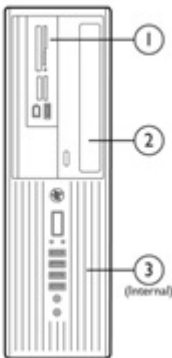
#### Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver.

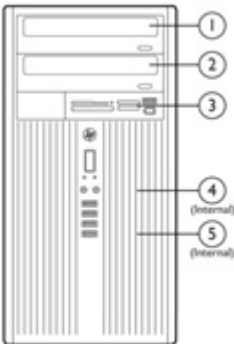
**Note:** GB = 1 billion bytes. Actual available capacity is less.

Technical Specifications – Hard Disk and Solid State Storage

SFF



MT



Storage Drive Support						
	SFF			MT		
	MCR	ODD	HDD	MCR	ODD	HDD
# of supported devices	1	1	2	1	2	2
Drive position	1	2	1,3	3	1,2	4,5

Controller

Hard Drive Controller

These systems provide four serial ATA (SATA) interfaces that support transfer rates up to 6.0 Gb/s (for ports 0 and 1, 3 Gb/s on all others). These systems can also support an external SATA (eSATA) device through an optional bracket/cable assembly.

SATA Interfaces

- 2 ea. SATA 3.0
- 1 ea. SATA 2.0
- 1 ea. eSATA

Host SATA Controller

Advanced Host Controller Interface (AHCI) Revision 1.2. The specification includes a description of the hardware/software interface between system software and the host controller hardware.



### Technical Specifications – Hard Disk and Solid State Storage

#### HP 250-GB 7200rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

<b>Capacity</b>	250,059,350,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	8 MB
<b>Logical Blocks</b>	488,397,168
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b> 1.0 ms <b>Average:</b> 8.5 ms <b>Full-Stroke:</b> 18 ms
<b>Height</b> (nominal)	1 in (2.54 cm)
<b>Width</b> (nominal)	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

#### HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

<b>Capacity</b>	500,107,862,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	16 MB
<b>Logical Blocks</b>	976,773,168
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b> 2.0 ms <b>Average:</b> 11 ms <b>Full-Stroke:</b> 21 ms
<b>Height</b> (nominal)	1 in/2.54 cm
<b>Width</b> (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

### Technical Specifications – Hard Disk and Solid State Storage

#### HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

<b>Capacity</b>	1,000,204,886,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	32 MB
<b>Logical Blocks</b>	1,953,525,168
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b> 2.0 ms <b>Average:</b> 11 ms <b>Full-Stroke:</b> 21 ms
<b>Height</b> (nominal)	1 in/2.54 cm
<b>Width</b> (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

#### HP 120-GB Solid State Drive

<b>Unformatted Capacity</b>	120 GB
<b>Architecture</b>	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller
<b>Interface</b>	Serial ATA 2.0 (3.0 Gb/s)
<b>Dimensions</b> (W x H x D)	2.74 x 0.37 x 4 in/6.98 x 0.95 x 10.2 cm
<b>Weight</b>	0.18 lb/80 g
<b>Bandwidth Performance</b>	<b>Sustained Sequential Read:</b> Up to 250 MB/s <b>Sustained Sequential Write:</b> Up to 70 MB/s <b>Random Read:</b> Up to 35K IOPs <b>Random Write:</b> Up to 6.6K IOPs
<b>Latency</b>	<b>Read:</b> 65-ms <b>Write:</b> 85-ms
<b>Power</b>	<b>DC power requirement:</b> 5 VDC 5%-100 mV ripple p-p <b>Total power consumption:</b> 0.15W (active); 0.075W (idle)
<b>Useful Drive Life</b>	35TB written, up to 20GB/day for 5 years <b>Operating Temperature:</b> 32° to 158° F (0° to 70° C) <b>Relative Humidity:</b> 5% to 95%
<b>Environmental</b> (all conditions, non-condensing)	<b>Maximum Wet Bulb Temperature</b> (operating): 84° F (29° C) <b>Shock:</b> 1,500 G/0.5-ms

### Technical Specifications – Hard Disk and Solid State Storage

#### HP 128 GB Solid State Drive

<b>Unformatted Capacity</b>	128 GB*
<b>Architecture</b>	Multi Level Cell (MLC) NAND
<b>Interface</b>	SATA 6 GB/sec
<b>Dimensions (W x H x D)</b>	2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm)
<b>Weight</b>	0.16 lb (73 g)
<b>Bandwidth Performance</b>	<b>Sustained Sequential Read:</b> Up to 450 MB/s
	<b>Sustained Sequential Write:</b> Up to 260 MB/s
	<b>Random Read:</b> up to 46K IOPs
	<b>Random Write:</b> up to 56K IOPs
<b>Latency</b>	<b>Read:</b> 55µs (TYP)
	<b>Write:</b> 55µs (TYP)
<b>Power</b>	<b>DC power requirement:</b> Min 4.5 V; Max 5.5 V
	<b>Total power consumption:</b> 160 mW (Active) ; <85 mW; (Idle)
<b>Useful Drive Life</b>	1.2 million device hours**
<b>Environmental</b> (all conditions, non-condensing)	<b>Operating Temperature:</b> 32° to 158° F (0° to 70° C)
	<b>Relative Humidity:</b> 5% to 95%
	<b>Maximum Wet Bulb Temperature (operating):</b> 84° F (29° C)
	<b>Shock:</b> 1,500 G/1.0 msec
<b>Regulations</b>	UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS CISPR 22:2002 Class B, Korea KCC, CE Mark
<b>Option kit contents</b>	HP 128 GB Solid State Drive, documentation, 3.5-inch bay adapter bracket, 3.5-inch bay adapter bracket screws, SATA cable

\* For solid state disk drives, GB means 1 billion bytes. 128GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity will vary by content

\*\* The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.

### Technical Specifications - Removable Storage

#### HP Blu-ray BDXL SATA Drive

<b>AMO Part Number</b>	B4F70AA	
<b>Height</b>	5.25-inch, half-height, tray-load	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Disc capacity</b>	128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL	
<b>Dimensions</b> W x H x D (max)	14.8 x 4.2 x 18 cm, (5.8 x 1.7 x 7.9 in)	
<b>Weight</b> (max)	2.1 lb (950 g)	
<b>Write speed</b>	<b>Single-layer</b>	<b>Double-layer</b>
<b>BD-R Triple-layer:</b> 2x, 4x CLV	2x, 4x CLV, 6x PCAV	2x, 4x CLV, 6x PCAV or ZCLV
<b>Quadruple-layer:</b> 2x, 4x CLV	2x CLV	2x CLV
<b>BD-RE Triple-layer:</b> 2x CLV	2x CLV	2x CLV
<b>DVD-R</b>	4x CLV, 8x, 12x PCAV, 16x CAV	4x CLV, 8x PCAV or ZCLV
<b>DVD-RW</b>	2x, 4x ZLV, 6x CLV or ZCLV	Not supported
<b>DVD+R</b>	4x CLV, 8x, 12x PCAV, 16x CAV	2.4x, 4x CLV, 8x PCAV or ZCLV
<b>DVD+RW</b>	2.4x, 4x, 6x CLV, 8x ZCLV	Not supported
<b>DVD-RAM</b>	2x, 3x CLV, 5x PCAV or CLV	
<b>CD-R</b>	16x CLV, 24x, 32x PCAV, 40x CAV or PCAV	
<b>CD-RW</b>	4x, 10x, 16x CLV, 24x ZCLV	
<b>Read speeds</b>	<b>Single-layer</b>	<b>Double-layer</b>
<b>BD-ROM</b>	8x CAV	8x CAV
<b>BD-R</b>	8x CAV	8x CAV
<b>BD-RE (SL/DL)</b>	6x CAV	6x CAV
<b>DVD-ROM</b>	16x CAV	8x CAV
<b>DVD-R</b>	16x CAV	8x CAV
<b>DVD-RW</b>	10x CAV	Not support

### Technical Specifications - Removable Storage

	<b>DVD+R</b>	16x CAV	8x CAV
	<b>DVD+RW</b>	10x CAV	Not support
	<b>BDMV (AACs Compliant Disc)</b>	2x CLV, 4.8x or 6x CAV	
	<b>DVD-RAM</b>	2x, 3x CLV, 5x PCAV or CLV	
	<b>DVD-Video (CSS Compliant Disc)</b>	8x CAV	
	<b>CD-R/RW/ROM</b>	40x / 40x / 40x CAV	
	<b>CD-DA (DAE)</b>	32x CAV	
	<b>80 mm CD</b>	16x CAV	
<b>Sustained Transfer rate</b>	<b>BD-ROM</b>	36 MB/s (8x) max.	
	<b>DVD-ROM</b>	21.6 MB/s (16x) max.	
	<b>CD-ROM</b>	6,000 KB/s (40x) max.	
<b>Access times</b> (typical reads, including setting)	<b>Random</b>	DVD-ROM: 150 ms (typical), CD-ROM: 140 ms (typical)	
	<b>Full Stroke</b>	DVD-ROM: 240 ms (typical), CD-ROM: 230 ms (typical)	
<b>Power</b>	<b>Source</b>	SATA DC power receptacle	
	<b>DC Power Requirement</b>	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 10%-100 mV ripple p-p	
	<b>DC Current</b>	5 VDC -1200 mA typical, 1500 mA maximum 12 VDC -1000 mA typical, 1500 mA maximum	
<b>Environmental</b> (all conditions non-condensing)	<b>Temperature (operating)</b>	41° to 122° F (5° to 50° C)	
	<b>Relative Humidity (operating)</b>	10% to 90%	
	<b>Maximum Wet Bulb Temperature (operating)</b>	86° F (30° C)	

### HP SATA 16x SuperMulti Drive

<b>AMO Part Number</b>	QS208AA		
<b>Height</b>	5.25-inch, half-height, tray-load		
<b>Orientation</b>	Either horizontal or vertical		
<b>Interface type</b>	SATA/ATAPI		
<b>Disc capacity</b>	8.5 GB DL or 4.7 GB standard		
<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
<b>Weight (max)</b>	2.6 lb (1.2 kg)		
<b>DVD Media Read Access</b>	<b>Random</b>	DVD: < 140 ms (typical), CD: < 125 ms (typical)	
	<b>Full Stroke</b>	DVD: < 250 ms (seek), CD: < 210 ms (seek)	

### Technical Specifications - Removable Storage

<b>Write speed</b>	<b>DVD-RAM</b>	Up to 5X
	<b>DVD+R</b>	Up to 16X
	<b>DVD+RW</b>	Up to 8X
	<b>DVD+R DL</b>	Up to 8X
	<b>DVD-R DL</b>	Up to 8X
	<b>DVD-R</b>	Up to 16X
	<b>DVD-RW</b>	Up to 6X
	<b>CD-R Up</b>	Up to 48X
	<b>CD-RW Up</b>	Up to 24X
	<b>Read speeds</b>	
	<b>DVD-RAM</b>	Up to 12X
	<b>DVD+RW</b>	Up to 8X
	<b>DVD-RW</b>	Up to 8X
	<b>DVD+R DL</b>	Up to 8X
	<b>DVD-R DL</b>	Up to 8X
	<b>DVD-ROM</b>	Up to 16X
	<b>DVD-ROM DL</b>	Up to 8X
	<b>DVD+R</b>	Up to 16X
	<b>DVD-R</b>	Up to 16X
	<b>CD-ROM, CD-R</b>	Up to 48X
<b>Power</b>	<b>CD-RW</b>	Up to 32X
	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirement</b>	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
<b>Environmental</b> (all conditions non-condensing)	<b>DC Current</b>	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum
	<b>Operating Temperature</b>	41° to 122° F (5° to 50° C)
	<b>Storage Temperature</b>	-22° F to 140° F (-30° C to 60° C)
	<b>Relative Humidity</b>	10% to 90%
	<b>Maximum Wet Bulb Temperature</b>	86° F (30° C)

### HP DVD-ROM Drive

<b>AMO Part Number</b>	AR629AA		
<b>Height</b>	5.25-inch, half-height, tray-load		
<b>Orientation</b>	Either horizontal or vertical		
<b>Interface type</b>	Serial ATA		
<b>Dimensions (W x H x D)</b>	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm)		
<b>Weight (max)</b>	2.1 lb (950 kg)		
	CD Media Read Access	Random	< 120 ms typical
		Full Stroke	< 200 ms typical

### Technical Specifications - Removable Storage

<b>Performance</b>	DVD Media Read Access	Random	< 130 ms typical
		Full Stroke	< 240 ms typical
		CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
	CD Media Read Transfer	CD-RW Read	Up to 4800 KB/s (32X)
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
		DVD-ROM SL Read	Up to 21600 KB/s (16X)
	DVD Media Read Transfer	DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
		DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
		DVD+R	Up to 21600 KB/s (16X)
		DVD-RW	Up to 10800 KB/s (8X)
		DVD-R DL	Up to 10800 KB/s (8X)
		DVD+RW	Up to 10800 KB/s (8X)
<b>Media Compatibility</b>	Media	Read	Write
	CD-ROM	Yes	No
	CD-R	Yes	No
	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
	Source	SATA DC power receptacle	
<b>Power Supply</b>	DC Power Requirement	5 VDC $\pm$ 5%	100 mV ripple p-p
		12 VDC $\pm$ 5%	200 mV ripple p-p
		5 VDC	1000 mA (typical) 1600 mA (max.)

### Technical Specifications - Removable Storage

<b>Rear Panel</b>	DC Current	12 VDC	1200 mA (typical) 2000 mA (max.)
		Total Drive Power (Standby Mode)	< 2.5W
	SATA Power Connector, 15-pin		
	SATA Data Connector, 7-pin		
<b>Environmental conditions</b> (all conditions non-condensing)	Markings to identify each connector		
	Operating Temperature	41° to 122° F (5° to 50° C)	
	Storage Temperature	–22° F to 140° F (–30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	

### HP 22-n-1 Media Card Reader

<b>USB Interface</b>	USB 2.0 High-speed interface
	<p><b>Note:</b> Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.</p> <p>Supports hardware ECC (Error Correction Code) function</p> <p>Supports hardware CRC (Cyclic Redundancy Check) function</p> <p>Supports MS 4-bit parallel transfer mode</p> <p>Supports MS-PRO 4-bit parallel transfer mode</p>
<b>Advance protocol support</b>	Supports MS PRO-HG Duo 4-bit parallel transfer mode
	Supports SD 4-bit parallel transfer mode
	Supports high-speed 50Mhz SD 4-bit card (version 2.0)
	Supports high-speed 52Mhz MultiMediaCard 8-bit card (version 4.2)
	Supports CF v4.0 with PIO mode 6 and Ultra DMA mode
	CompactFlash Type I
	CompactFlash Type II
	Microdrive
	MultiMediaCard
	Reduced Size MultiMediaCard (RS MultiMediaCard)
	MultiMediaCard 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC)
	Reduced Size MultiMediaCard 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC)
	Secure Digital Card (SD)
	Secure Digital High Capacity (SDHC)



### Technical Specifications - Removable Storage

<b>Supported media type</b>	miniSD
	miniSD High Capacity
	Micro SD (T-Flash)
	Micro SD HC
	Memory Stick
	Memory Stick Select
	Memory Stick Duo (MS Duo)
	Memory Stick PRO (MS PRO)
	Memory Stick PRO Duo (MS PRO Duo)
	Memory Stick PRO-HG Duo
	MagicGate Memory Stick (MG)
	MagicGate Memory Stick Duo
	Picture Card
<b>Supported media type with card adapter</b>	Memory Stick Micro (M2)
	MultiMediaCard Micro
<b>Environmental</b>	Operational Environmental Extremes
	<p>Test Parameters/Conditions - Power applied, unit operating on system <math>\pm 5\%</math> nominal supply voltage.</p> <p>10°C 10% R.H. = 24 hours  10°C 90% R.H. = 24 hours  20°C 90% R.H. = 24 hours  30°C 90% R.H. = 24 hours  40°C 90% R.H. = 24 hours  50°C 90% R.H. = 24 hours  50°C 10% R.H. = 24 hours</p>
	Storage Environmental Extremes
	<p>Test Parameters/Conditions</p> <p>140°F (60°C) @ 80% R.H. for 96 hours  -22°F (-30°C) @ 20% R.H. for 48 hours  No power applied  Delta °C &lt; 1.0°C/min  Delta % R.H. &lt; 1.5% R.H./min</p>
<b>Approvals</b>	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0
	Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3
	FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

### Technical Specifications – Memory

#### System Memory Support

The HP Compaq Pro 6305 Business PC supports:

- Two channels of non-ECC DDR3 unbuffered dual in-line memory modules (UDIMM) or DDR3 unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- 64-bit wide channels
- DDR3 system memory I/O voltage of 1.5V
- Theoretical Maximum Memory Bandwidth:
  - 10.6 GB/s in single-channel mode of 21.3 GB/s in dual-channel mode assuming DDR3 1333 MT/s
  - 12.8 GB/s in single-channel mode or 25.6 GB/s in dual-channel mode assuming DDR3 1600 MT/s
  - 32 GB maximum memory support depending upon available number of DIMM sockets

**CAUTION:** You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

#### Memory Configurations:

Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

**NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Total Memory	Socket			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
<b>2 GB</b>	2 GB	unpopulated	Unpopulated	unpopulated
<b>4 GB</b> (dual channel)	2 GB	unpopulated	2 GB	unpopulated
<b>8 GB</b> (dual channel)	2 GB	2 GB	2 GB	2 GB
<b>16 GB</b> (dual channel)	8 GB	4 GB	4 GB	4 GB

### Technical Specifications - Communications

#### Broadcom NetXtreme Gigabit Ethernet BCM 5761 (integrated)

<b>Connector</b>	RJ-45
<b>Controller</b>	Broadcom 5761 PCI-Express LAN Controller
<b>Memory</b>	8 MB NVRAM serial Flash
<b>Data rates supported</b>	10/100/1000 Mbps
<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, 802.3i, and 802.3x
<b>Bus architecture</b>	PCI-E
<b>Data path width</b>	Single channel, PCI-E
<b>Data transfer mode</b>	Bus-master DMA
<b>Power requirement</b>	1.8W @ 3.3V
<b>Boot ROM support</b>	Yes
<b>Network transfer mode</b>	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
<b>Network transfer rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
<b>Environmental</b>	<b>Operating Temperature:</b> 32° to 131°F (0° to 55° C) <b>Operating Humidity:</b> 131° F (55° C) with 5% to 95% non-condensing humidity
<b>Management capabilities</b>	ACPI, WOL and DMI 2.0, PXE 2.1, WfM 2.0, Broadcom mgmt utility, ASF2.0 profiles

#### HP 802.11 b/g/n Wireless Network Connection

<b>Dimensions (L x H)</b>	2.8 x 2.2 in (7.0 x 5.7 cm)
<b>Weight</b>	0.08 lbs (40 g)
<b>Controller</b>	Ralink RT2790
<b>System interface</b>	PCI Express x1
<b>Network standard</b>	802.11 b/g/n
<b>Frequency band</b>	2.400 - 2.497 GHz
<b>Operating temperature</b>	14° to 149°F, operating (-10° to 65°C, operating)
<b>Storage temperature</b>	-40° to 176°F, non-operating (-40° to 80°C, non-operating)
<b>Humidity</b>	10-90% operating 5-95% non-operating
<b>Operating voltage</b>	3.3V +/- 9% 12V +/- 8%

### Technical Specifications - Communications

	Platform/WLAN Mode	Power Consumption
<b>Power Consumption</b>	Maximum Power Consumption:	10 Watts
	Transmit Only	4 Watts maximum averaged power over 1 second
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second
<b>Output Power</b> (approximate)	802.11b mode	+19 dBm +/- 1.0 dB maximum
	802.11g mode	+17 dBm +/- 1.0 dB maximum
	EWC mode	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)
<b>Security</b>	IEEE and WiFi compliant 64 / 128 bit WEP encryption	
	AES: CCM	
	802.1x authentication	
	WPA: 802.1x. WPA-PSK and TKIP	
	WPA2 certification	
<b>Antenna</b>	IEEE 802.11i	
	Cisco Certified Extensions, all versions through V5	
<b>Certifications</b>	HP part number 497317-003	
<b>Certifications for use by country</b>	Wi-Fi certified	
	United States, Canada, Peru, Taiwan	

### Technical Specifications - Audio

#### High Definition Audio

<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek 2-channel ALC221 codec
<b>Audio I/O Ports</b>	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5mm
<b>Internal Speaker Amplifier</b>	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
<b>Multi-streaming Capable</b>	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
<b>Sampling</b>	8 kHz - 192 kHz
<b>Wavetable Syntheses</b>	Yes – Uses OS soft wavetable
<b>Analog Audio</b>	Yes
<b># of Channels on Line-Out</b>	Stereo (Left & Right channels)
<b>Internal Speaker</b>	Yes
<b>External Speaker Jack</b>	Yes

#### HP Thin USB Powered Speakers

<b>On/Off/Volume Controls</b>	Right side of right speaker
<b>Power LED</b>	Front of right speaker (green)
<b>Frequency Response</b>	F0 to 20kHz
<b>Watts</b>	2/3 watt (normal/maximum)
<b>Dimensions/Speaker (H x W x D)</b>	5.72 x 3.74 x 0.96 in 14.52 x 9.50 x 2.45 cm
<b>Net Weight</b>	0.68 lbs 0.31kg
<b>Color</b>	Black
<b>Environmental (all conditions non-condensing)</b>	Operating Temperature: 14° to 104° F (-10° to 40° C) Relative Humidity: 40% to 90%
<b>Speaker Cable Length</b>	Input Cord: 5.91 ft (1800 mm) L-channel Cord: 3.28 ft (1000 mm) USB Cord: 5.91 ft (1800 mm)

### Technical Specifications - Input/Output Devices

#### HP USB Standard Keyboard

<b>Physical characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg)
	Operating voltage	+ 5VDC $\pm$ 5%
<b>Electrical</b>	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Microsoft® PC 99 - 2001	Functionally compliant
	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
<b>Environmental</b>	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

### Technical Specifications - Input/Output Devices

<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
<b>Kit contents</b>	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

### HP PS/2 Standard Keyboard

<b>Physical Characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC $\pm$ 5%
	Power consumption	50-mA maximum (with three LEDs ON)
<b>Electrical</b>	System interface	PS/2 6-pin mini din connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
	Languages	38 available
<b>Mechanical</b>	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft 1.8 m
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
<b>Environmental</b>	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration

### Technical Specifications - Input/Output Devices

Non-operating vibration	4-g peak acceleration
Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence

#### Approvals

UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

#### Ergonomic compliance

ANSI HFS 100, ISO 9241-4, and TUVGS

## HP USB Smart Card (CCID) Keyboard

### Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN
- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP Client Security Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP Client Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

#### Key Benefits:

- Protects against unauthorized access with smart card technology
- Delivers even greater security when combined with a HP Client Security smart card and the HP Client Security Software
- Combination of username and password or pin with a smart card or security token
- Secures online transactions using digital signatures and certificates
- Conforms to industry standards for ease of setup and use
- Delivers long product life and quiet operation with high-impact materials and lubricated keys
- Spill drain feature

#### Physical Characteristics

Keys	104, 105, 106, 107, 109 layout (depending upon country)
Form factor	USB basic smart card keyboard
Colors	Carbonite/Silver
Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in 46.3 x 16.1 x 3.3 cm
Weight	2 lb (0.9 kg) minimum



### Technical Specifications - Input/Output Devices

<b>Electrical</b>	Operating voltage	+ 5VDC $\pm$ 5%	
	Power consumption	100-mA maximum (with four LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
	Microsoft PC 99 - 2001	Functionally compliant	
	Languages	30+ available	
	Keycaps	Standard design	
<b>Mechanical</b>	Switch actuation	55 g nominal peak force with tactile feedback	
	Switch life	20 million keystrokes (using Hasco modified tester)	
	Switch type	Contamination-resistant membrane	
	Key-leveling mechanisms	For all double-wide and greater-length keys	
	Cable length	6 ft (1.8 m)	
	Microsoft PC 99 - 2001	Mechanically compliant	
	Acoustics	43-dBA maximum sound pressure level	
	Operating temperature	50° to 122° F (10° to 50° C)	
<b>Environmental</b>	Non-operating temperature	-22° to 140° F (-30° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
	Support	All ISO 7816 smart cards	
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)	
	Chipset	SCM STCIII	
<b>SmartCard Function</b>	Standard APIs supported	PC/SC, EMV2000, CT-API	
	Power	USB Port	
		Short circuit detection (protects smart card and reader)	
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
		Supports 3-V and 5-V cards	
	Power consumption	100-mA maximum draw	
	Communication	From card	9600 bps to 330,000 bps
		From computer	12 Mbps (USB transfer speed)
	Landing mechanism	Contact device	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles

### Technical Specifications - Input/Output Devices

	Interface modes	CCID protocol
	Reader performance interface	USB connection
	Electro-magnetic standards	Europe 2004/108/EC USA USAFCC part 15
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF	
<b>Ergonomic Compliance</b>	ISO 9241-4, TUVGS	
<b>Kit Contents</b>	Keyboard, I/O Security and Documentation CD, warranty card	

### HP USB PS/2 Washable Keyboard

	Keys	104 (US) layout or 105 (EU) layout (depending upon country)
<b>Physical Characteristics</b>	Dimensions (L x W x H)	17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)
	Weight	1.7 lb (0.77 kg) minimum
	Operating voltage	+ 5VDC $\pm$ 5%
	Power consumption	50-mA maximum (with three LEDs ON)
<b>Electrical</b>	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
<b>Mechanical</b>	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	7 ft (2.2 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
<b>Environmental</b>	Operating shock	40 g, six surfaces

### Technical Specifications - Input/Output Devices

#### Environmental

Non-operating shock	80 g, six surfaces
Operating vibration	2-g peak acceleration
Non-operating vibration	4-g peak acceleration
Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence

#### Operating system support

Windows® 7, Windows Vista, Windows XP Professional

#### Approvals

UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X

#### Ergonomic compliance

ANSI HFS 100, ISO 9241-4, and TUVGS

### HP Wireless Keyboard and Mouse

<b>Keyboard</b>	Dimensions (H x L x W)	1.47 x 18.06 x 6.43 in (37.3 x 458.8 x 163.2 mm)
	Weight – Without Two AA Alkaline Batteries	1.96 lb (890 g)
<b>Mouse</b>	Dimensions (H x L x W)	1.51 x 4.69 x 2.71 in (38.4 x 119 x 68.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.17 lb (80 g)
<b>Receiver</b>	Dimensions (H x L x W)	0.31 x 0.72 x 2.24 in (8 x 18.4 x 57 mm)
	Weight	0.27 oz (7.6 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64* Windows Vista or Windows XP Available USB port for the receiver CD-ROM Drive		
*This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See <a href="http://www.microsoft.com/windows/windows-7/">http://www.microsoft.com/windows/windows-7/</a> for details.		
<b>System Requirements</b>	Product Safety	UL; CSA /TUV (Europe only); CE Mark
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CISPR; ACA; BSMI; MIC; VCCI
	CE Mark	EN 55022:1998; EN 55024
	Design Guidelines for PCs	PC 99 - connector overmold colours; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets

### Technical Specifications - Input/Output Devices

USA	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements
Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, and Thailand.

#### Environmental

Keyboard contains 25% post-consumer recycled plastic material

### HP PS/2 Optical Mouse

#### Dimensions (H x L x W)

1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)

#### Weight

4.44 oz (126 g)

Operating temperature -32° to 104°F (0° to 40° C)

Non-operating temperature -4° to 140°F (-20° to 60° C)

Operating humidity 10% to 90%  
(non condensing at ambient)

Non-operating humidity 10% to 90%  
(non condensing at ambient)

#### Environmental

Operating shock 40 g, 6 surfaces

Non-operating shock 80 g, 6 surfaces

Operating vibration 2 g peak acceleration

Non-operating vibration 4 g peak acceleration

Drop (out of box) 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face

Operating voltage 5 VDC  $\pm$  10%

Power consumption 100mA

System consumption PS/2 mini-din connector

#### Electrical

ESD CE level 4, 15 kV air discharge

EMI-RFI Conforms to FCC rules for a Class B computing device

Microsoft PC99 - 2001 Functionally compliant

Resolution 400  $\pm$  20% DPI

Tracking speed 10 in/s (25.4 cm/s) maximum

Acceleration 100 in/s/s (2.54 m/s/s)

### Technical Specifications - Input/Output Devices

<b>Mechanical</b>	Switch actuation	61 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
	Width	8 mm
<b>Scroll wheel</b>	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

### HP USB Optical Mouse

<b>Dimensions</b> (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
<b>Weight</b>	0.27 lb (0.12 kg)
<b>Cable length</b>	72.8 in (185 cm)
<b>System requirements</b>	Available USB port

### HP USB Laser Mouse

<b>Scroll Wheel</b>	24	
<b>Maximum Rotation Speed</b>	48 rats/sec	
<b>Switch Type</b>	Wheel	
<b>Switch Life</b>	Button - 3,000,000	
	Wheel - 1,000,000 times	
	Tilt switch - 500,000 times	
<b>Environmental</b>	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)

### Technical Specifications - Input/Output Devices

<b>Electrical</b>	Operating Humidity	10% to 90% (non-condensing at ambient)
	Non-operating Humidity	20% to 80% (non-condensing at ambient)
	Operating Shock	40 g, six surfaces
	Non-operating Shock	80 g, six surfaces
	Operating Vibration	2-g peak acceleration
	Non-operating Vibration	4-g peak acceleration
	Operating Voltage	+ 5VDC $\pm$ 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
<b>Mechanical</b>	EMI-RFI	FCC Class B
	PC98	PC 99 Compliant
	Resolution	800dpi
	Tracking Speed	25 cm/sec
	Acceleration	0.5mm
	Switch Actuation	0.6N (60gf)
	Switch Life	Button - 3,000,000 Wheel - 1,000,000 times Tilt switch - 500,000 times
	Cable Length	1850mm
	PC98-99	PC99 compliant
	Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL

### HP USB PS/2 Washable Mouse

<b>Dimensions</b> (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)		
<b>Weight</b>	4.44 oz (126 g)		
<b>Environmental</b>	Operating temperature	-32° to 104°F (0° to 40° C)	
	Non-operating temperature	-4° to 140°F (-20° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	

### Technical Specifications - Input/Output Devices

	Non-operating humidity	10% to 90% non-condensing
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
<b>Electrical</b>	Operating voltage	5 VDC $\pm$ 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector or USB
	ESD	CE level 2 8 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Microsoft® PC99 – 2001	Functionally compliant
	Resolution	1000 $\pm$ 20% DPI
	Tracking speed	14 in/s ( 35.56 cm/s) maximum
	Acceleration	2 g
	Switch actuation	70 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Cable length	8.8 ft total 70 cm+ 2m extension
	Microsoft PC99 – 2001	Mechanically compliant
	Width	6 mm
<b>Scroll wheel</b>	Diameter	1 in (25.4 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	3 million operations
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory approvals</b>	Compliant	FCC, CE Mark, ICES-003-B, IP66/NEMA4X
<b>Compatibility</b>	Operating system support	Windows 7, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* (No driver is required for this device. Native support is provided by the operating system.), xpe, ce.net, Linux, XP-64

\* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: <http://www.windowsvista.com/upgradeadvisor>. For Windows Vista system requirements, visit: <http://www.windowsvista.com/systemrequirements>.

### Technical Specifications – Power

#### Unit Environment and Operating Conditions

##### General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F (-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

\*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

#### Power Supply

	SFF	MT
Standard Efficiency	240W active PFC	320W active PFC
High Efficiency*	240W active PFC 87/90/87% efficient @ 20/50/100% load	320W active PFC 87/90/87% efficient @ 20/50/100% load
Operating Voltage Range	90 - 264 VAC	
Rated Voltage Range	100 - 240 VAC	
Rated Line Frequency	50/60 Hz	
Operating Line Frequency Range	47 - 63 Hz	
Rated Input Current	4A	5.5A
Rated Input Current with Energy Efficient* Power Supply	4A	5.5A
Current Leakage (NFPA 99)	< 275 µA	< 450 µA
Power Supply Fan	92mm variable speed	
Power cord length	6.0 ft. (1.83 m)	
Total Cord Length	N/A	N/A

\*High efficiency power supply is a requirement for ENERGY STAR qualification in conjunction with a select range of processors and modules



### Technical Specifications – Weights & Dimensions

#### Weights & Dimensions

(configured with 1 HDD & 1 ODD)

	SFF	MT
<b>Chassis (H x W x D)</b>	4.0 x 13.3 x 14.9 in 100 x 338 x 379 mm	14.9 x 7.0 x 17.0 in 377 x 177 x 431 mm
<b>System Volume</b>	790.3 cu in 13.0 L	782.77 cu in 12.8 L
<b>System Weight*</b>	16.7 lb 7.6 kg	20.5 lb 9.3 kg
<b>Max Supported Weight (desktop orientation)</b>	77.0 lb 35.0 kg	N/A
<b>Tower Stand (H x W x D)</b>	1.1 x 7.0 x 7.9 in (29 x 178 x 200 mm)	N/A
<b>Packaging (H x W x D)</b>	9.0 x 19.8 x 23.4 in 229 x 500 x 594 mm	11.6 x 19.7 x 23.2 in 295 x 500 x 590 mm
<b>Shipping Weight*</b>	17.9 lb 8.1 kg	28.8 lb 13.1 kg
<b>Palletization Profile</b>	4-units per layer 10-layer max. 40-units per pallet	4-units per layer 8-layer max. 32-units per pallet

### Environmental Specifications

#### Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US ENERGY STAR®
- IT ECO declaration
- EPEAT® Gold where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country

#### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Small Form Factor Desktop model is based on a typically configured product.

Energy Consumption	<u>115 VAC</u>		<u>230 VAC</u>		<u>100 VAC</u>	
	MT	SFF	MT	SFF	MT	SFF
Normal Operation	51.7 W	48.3 W	52 W	47.7 W	51.4 W	47.6 W
Sleep (Energy Star low power mode)	2.9 W	3.0 W	3.1 W	3.3 W	2.9 W	3.0 W
Off	0.9 W	1.0 W	1.1 W	1.1 W	0.9 W	0.9 W

#### NOTE:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

#### Heat Dissipation\*

	<u>115 VAC</u>		<u>230 VAC</u>		<u>100 VAC</u>	
	MT	SFF	MT	SFF	MT	SFF
Normal Operation	177 BTU/hr	165 BTU/hr	178 BTU/hr	163 BTU/hr	176 BTU/hr	163 BTU/hr
Sleep	10 BTU/hr	10 BTU/hr	11 BTU/hr	11 BTU/hr	10 BTU/hr	10 BTU/hr
Off	3 BTU/hr	3 BTU/hr	4 BTU/hr	4 BTU/hr	3 BTU/hr	3 BTU/hr

\* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

#### Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296) (Typically Configured)

	Sound Power (LWAd, bels)		Sound Pressure (LpAm, decibels)	
Idle	3.8	3.8	28	28
Fixed Disk (random writes)	3.9	3.8	29	28

#### Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

### Environmental Specifications

#### MT:

- Intel LGA775 processor socket
- 8 USB ports
- 1 empty PCI slot (w/ optional PCI riser card) , or  
1 empty PCIe x16 slot (w/optional PCIe riser card)
- 1 internal drive slot
- 1 Slimline optical drive slot
- 3 memory slots
- 1 Serial/Parallel Port (optional)

#### SFF:

- Intel LGA775 processor socket
- 8 USB ports
- 2 empty PCI slots (2 low profile or 2 full-height with optional riser)
- 1 empty PCIe x1 slot
- 1 empty PCIe x16 slot
- 1 internal drive slot
- 1 SATA optical drive slot
- 4 memory slots
- 1 Serial Port (optional)
- 1 external diskette drive (optional)
- Spare parts are available throughout the warranty period and or for up to "5" years after the end of production

#### Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

#### Battery Size

CR2032 (coin cell)

#### Battery Type

Lithium

#### Additional Information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level where HP registers commercial desktop products. See <http://www.epeat.net> for registration status in your country. Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 5.6% post-consumer recycled plastic (by wt.)

This product is 94.82% recyclable when properly disposed of at end of life.

#### Packaging Materials

External                      Paper Corrugated – 2278 g

### Environmental Specifications

PLASTIC/EPS (Expanded Polystyrene) – 114 g  
PLASTIC/Polyethylene low density – 56 g  
PLASTIC/Polypropylene – 15 g

The PAPER/Corrugated packaging material contains at least 30.6% recycled content.  
The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 0% recycled content.  
The PLASTIC/Polyethylene low density packaging material contains at least 0% recycled content.  
The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 0% recycled content.

#### RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at:

[http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm<sup>2</sup>/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

#### Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.

### Environmental Specifications

- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

#### End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

#### Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

---

### Technical Specifications – Miscellaneous Features

#### Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

#### Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, bootblock recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

### Technical Specifications – Miscellaneous Features

#### Additional Features

	Description
<b>Towerable Orientation</b>	Product can be oriented as either a desktop or a tower
<b>Drive Lock</b>	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided. DPS Access through F10 Setup during Boot A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user
<b>Drive Protection System</b>	Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures
<b>SMART Technology (Self-Monitoring, Analysis and Reporting Technology)</b>	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted
<b>SMART I - Drive Failure Prediction</b>	Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
<b>SMART II - Off-Line Data Collection</b>	By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
<b>SMART III - Off-Line Read Scanning with Defect Reallocation</b>	IOEDC: I/O Error Detection Circuitry Detects errors in Read/Write buffers on HDD cache RAM
<b>SMART IV - End-to-End CRC for hard drives</b>	Interface in F10 setup provides confirmation of SMART IV support.

After-Market Options (availability may vary by region)

### Communication Devices

#### Part Number

HP Wireless 802.11 b/g/n NIC (PCIe x1)  
Intel ethernet i210-T1 GbE NIC

FH971AA  
E0X95AA

### Graphics Solutions

#### Part Number

AMD Radeon HD 6350 Graphics (PCIe x16)  
AMD Radeon HD 7450 Graphics Card  
Nvidia NVS 300 Graphics (PCIe x16)  
Nvidia NVS 310 Graphics (PCIe x16)  
HP DisplayPort Cable Kit  
HP DisplayPort To Dual Link DVI-D Adapter  
HP DisplayPort To DVI-D Adapter  
HP DisplayPort to HDMI Adapter  
HP DisplayPort to VGA Adapter  
HP DMS-59 to Dual DVI Cable  
HP DMS-59 to Dual DisplayPort Adapter

QK638AA  
B1R44AA  
BV456AA  
A7U59AA  
VN567AA  
NR078AA  
FH973AA  
BP937AA  
AS615AA  
DL139A  
XP688AA

### Data Storage Drives and Accessories

#### Part Number

HP 300GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive  
(Includes 3.5"adapter)  
HP 500GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive  
HP 1TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive  
HP 500GB SATA 6G (8GB Cache) SSHD Drive (includes 3.5" adapter)  
HP eSATA Adapter  
HP Removable SATA Hard Drive Enclosure (frame & carrier)  
HP Removable SATA Hard Drive Enclosure (carrier only)

FM802AA  
QK554AA  
QK555AA  
E1C62AA  
FH966AA  
RY102AA  
RY103AA



After-Market Options (availability may vary by region)

### Input Devices

#### Part Number

HP PS/2 Standard Keyboard	DT527A
HP USB Standard Keyboard	DT528A
HP USB Gray Keyboard	DT529A
HP USB Smart Card (CCID) Keyboard	BV813AA
HP USB Washable Keyboard	VF097AA
HP USB and PS/2 Washable Mouse	BM866AA
HP USB and PS/2 Washable Keyboard and Mouse Kit	BU207AA
HP PS/2 Optical Mouse	EY703AA
HP USB Optical Mouse	DC172AT
HP USB Laser Mouse	GW405AT
HP Wireless Keyboard and Mouse Combination (Keyboard contains 25% post-consumer recycled plastic material)	NB896AA

### System Memory

#### Part Number

HP 2 GB DDR3 - 1600 DIMM	B4U35AA
HP 4 GB DDR3 - 1600 DIMM	B4U36AA
HP 8 GB DDR3 - 1600 DIMM	B4U37AA

### Multimedia Devices

#### Part Number

HP Thin USB Powered Speakers	KK912AA
HP DVD-ROM Drive	AR629AA
HP SATA 16x SuperMulti Drive	QS208AA
HP Blu-ray BDXL SATA Drive	B4F70AA
HP USB HD 720P Business Webcam	QP896AA
HP Business Headset	QK550AA
HP USB Business Speakers	D9J19AA

### Removable Media Storage

#### Part Number

HP 22-n-1 Media Card Reader	AR941AA
-----------------------------	---------

### Security Devices

#### Part Number

HP Business PC Security Lock	PV606AA
HP SFF Solenoid Lock and Hood Sensor	BP428AA
HP MT Solenoid Lock and Hood Sensor	DE618A
HP SFF Wall Mount/Security Sleeve	VN570AA
HP Keyed Lock Cable	BV411AA

After-Market Options (availability may vary by region)

### Stands and Accessories

#### Part Number

HP Integrated Work Center Stand (SFF)	QP897AA
HP SFF Tower Stand	VN569AA
HP Serial Port Adapter (RS-232 compatible)	PA716A
HP Parallel Port Adapter	KD061AA
HP 5.25" Blank Bezel Kit (50 pack)	DC177B

### LANDesk Software (E-Delivery)

#### Part Number

LANDesk Management Suite License - 1-499 Nodes E-Delivery	QY369AAE
LANDesk Management Suite License - 500-999 Nodes E-Delivery	QY370AAE
LANDesk Management Suite License - 1000-1999 Nodes E-Delivery	QY371AAE
LANDesk Management Suite License - 2000-4999 Nodes E-Delivery	QY372AAE
LANDesk Management Suite License - 5000-9999 Nodes E-Delivery	QY373AAE
LANDesk Security Suite License E-Delivery	QY379AAE
LANDesk Management Suite 1 Year Maintenance - 1-499 Nodes E-Delivery	HZ825AAE
LANDesk Management Suite 1 Year Maintenance - 500-999 Nodes E-Delivery	HZ826AAE
LANDesk Management Suite 1 Year Maintenance - 1000-1999 Nodes E-Delivery	HZ827AAE
LANDesk Management Suite 1 Year Maintenance - 2000-4999 Nodes E-Delivery	HZ828AAE
LANDesk Management Suite 1 Year Maintenance - 5000-9999 Nodes E-Delivery	HZ829AAE
LANDesk Security Suite 1 Year Subscription	HZ830AAE
LANDesk Patch Management 1 Year Subscription - 1-499 Nodes E-Delivery	HZ831AAE
LANDesk Patch Management 1 Year Subscription - 500-999 Nodes E-Delivery	HZ832AAE
LANDesk Patch Management 1 Year Subscription - 1000-1999 Nodes E-Delivery	HZ833AAE
LANDesk Patch Management 1 Year Subscription - 2000-4999 Nodes E-Delivery	HZ834AAE
LANDesk Patch Management 1 Year Subscription - 5000-9999 Nodes E-Delivery	HZ835AAE

### Monitors

#### Part Number

HP Compaq LE1711 17-inch LCD Monitor	EM886AA
HP Compaq LE1911 19-inch LCD Monitor	EM887AA
HP Compaq LE2002x 20-inch LED Backlit LCD Monitor	LL763AA
HP Compaq LE2002xi 20-inch LCD Monitor with IWC Stand	QC841AA
HP Compaq LE2002xm 20-inch LED Backlit LCD Monitor	A2U63AA
HP Compaq LE2202x 21.5-inch LED Backlit LCD Monitor	LL649AA
HP Compaq L2206tm 21.5-inch LED Backlit Touch Monitor	B0L55AA
HP L2401x 24-inch LED Backlit Monitor	B6R21AA

### After-Market Options (availability may vary by region)

Copyright © 2013 Hewlett-Packard Development Company, L.P.

All rights reserved. Microsoft, Windows, Windows Vista, and Windows 7 are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. All other product names mentioned herein may be trademarks of their respective companies.

The information contained herein is subject to change without notice and is provided "as is" without warranty of any kind. The warranties for HP products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.